PRINCIPLES OF JOB COSTING

Sheet Metal and Air Conditioning Contractors' National Association

Principles of Job Costing

Prepared under the supervision of the SMACNA Business
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Fails Management Institute

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Printed in United States of America
Second Printing 1996

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PRINCIPLES OF JOB COSTING

Foreword

The primary job of a manager in a sheet metal company is to maximize the firm's profitability. There are three main components to profitability—Cost Control, Accurate Estimates and Management of Cash Flow. When properly controlled each of these areas will lead to improvements in the bottom line. A sheet metal company that controls its cost of construction and operations, prepares accurate estimates and manages its cash flow can maximize its success.

This manual, ***Principles Of Job Costing*** has been designed to assist the SMACNA contractor in establishing, operating and profiting from job costing. The manual is divided into 4 main sections. The first section, Costing Logic describes the concepts behind job costing, The Computer as a Job Cost Tool examines how computers can be used to assist in the job costing process. Section 3, Operating the Job Cost System, provides procedures and forms that can be used in setting up your job costing system. The final section, Job Cost Reporting provides sample job costing reports.

One key to successful job costing is the establishment of operating controls and procedures over the various business functions to be performed. ***Principles Of Job Costing*** contains forms and reports used in collecting and reporting the data necessary for the efficient control of your business. Although there are many sample forms contained in this publication, the use of any of them should be evaluated carefully. Before adopting a new form, you must be satisfied that it serves a useful function and does not merely contribute "paperwork" to your organization.

Computers are an excellent tool to assist in the processing and reporting on job costing information. Throughout this manual, you will find sample entry screens and reports from a number of different computerized software packages. There are a wide variety of good computerized job cost accounting software programs available in the marketplace, each designed to meet individual needs for job cost information. It is not the intent of this manual to discuss the pros and cons of different software packages, but to highlight how sheet metal contractors can benefit from using computers in their company.

Needs for job cost information are peculiar to the individual sheet metal contractor. That is, what is desirable or even necessary for one contractor may be unnecessary or less desirable for another. Business size, organizational structure, typical job size, and the type of work performed all influence what is a "good" job cost information for the individual contractor.

For these reasons, no attempt is made to present a single method or system which will be the best for all companies. Rather, this manual serves as a guide for each contractor to customize his own job costing system to fit the needs of his own company. With the concepts, methods, forms and discussion presented on the following pages, each SMACNA contractor can improve his job costing system to the point that it is meaningful, timely, accurate and relatively easy to operate. This manual is dedicated to helping SMACNA contractors achieve these objectives.

Costing Logic

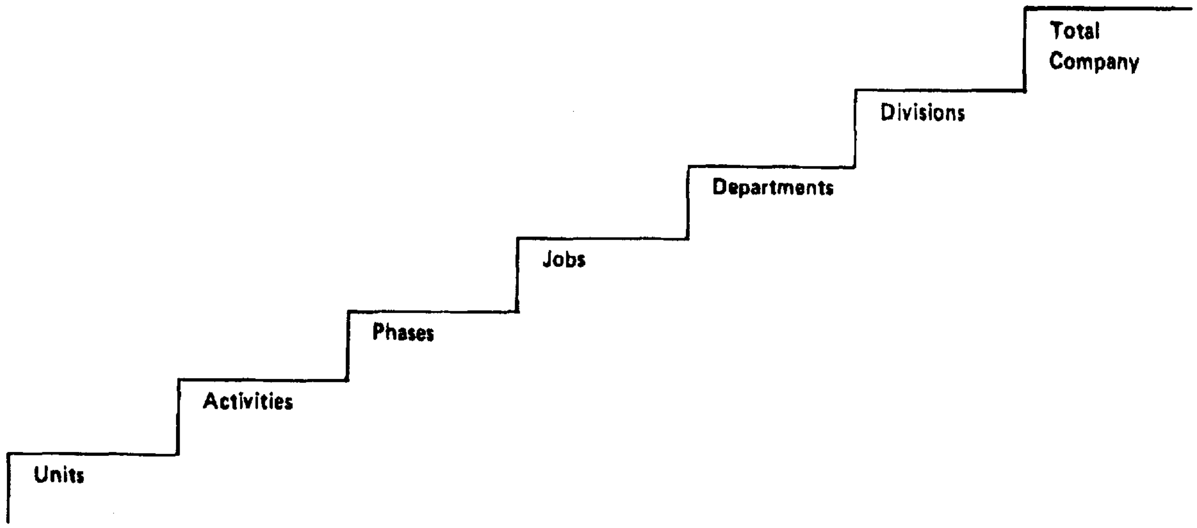
Job Costing is the collection of financial information relating to construction activities, accumulated on a job-by-job basis. The process of job costing should be viewed as an integral part of the general accounting system.

A major use for job cost information is to compare estimated cost with actual cost. Such information can enable management to detect problem and opportunity areas in time to capitalize on them by taking appropriate action. Furthermore, such information can be used to improve the accuracy of future estimates.

From the broad picture of a profit and loss statement for a particular period all the way to the detail of the cost of a section of rectangular duct, cost information can be arranged to tell management what it needs to know about the cost of doing business. ***Exhibit 1***, pictures the stairsteps of cost information which provide the basic logic by which cost information should be accumulated and used.

Exhibit 1

COST "STAIRSTEPS"



The primary job of a manager in a sheet metal company is to maximize the firm's profitability. The results of these efforts are shown by the profit and loss statement (also referred to as an Income Statement). This financial report shows the profitability of a sheet metal contractor within a given period, (whether it be one month, a quarter or a year).

You will note that within the Income Statement reflected in ***Exhibit 2*** that there are two main sections—Earnings from Construction and Selling, General and Administrative Expenses. The upper part of the Income Statement examines the revenue and costs for all jobs on which work was performed during a period of time. Whether the company has ten jobs or 100 jobs in a period, the eventual results of all these jobs are reflected within the Income Statement. Although the Income Statement provides management with an overall view of the firm's profitability from construction, it provides management with very little information about the nature of the costs incurred and gross profit earned.

Exhibit 2

Sample Sheet Metal Contractor
Income Statement
Year Ended December 31, 199x

Earnings From Construction		
Construction Revenue	$2,350,000	
Cost of Construction	1,997,500	
Gross Profit		$352,500
Selling, General and Administrative		
Selling Expenses	$ 85,760	
General and Administration	125,200	
Total Selling, General & Administratiive		$210,960
Net Income From Operations		141,540
Non-Operating Income (Expense)		10,500
Net Income Before Tax		151,040
Income Taxes		54,500
Net Income After Taxes		$ 96,540

As sheet metal contractors have become more diversified in recent years, they have realized the need for departmentalized Income Statements. Departmentalized Income Statements show the revenue, costs and profits for different types of jobs. Such types of work frequently include ventilating sheet metal, architectural sheet metal, specialty fabrication and erection, heating jobs, air conditioning jobs, etc. The more kinds of work your company does, the more imperative it is that you have job cost information summarized in a form which allows you to study the profitability of the different kinds of work that your company is doing.

Thus, step two in the costing logic, as shown in ***Exhibit 3*** is the break out of the overall company profit and loss statement in a way that provides profit and loss data on the different types of work performed by the company. Take note that the total revenue, costs and gross profit from all of the types of jobs ties to the overall company Income Statement (Exhibit 2).

Exhibit 3

Sample Sheet Metal Contractor
Departmental Income Statement
Year Ended December 31, 199x

Department	Revenue Earned	Cost of Construction	Gross Profit
Ventilating Sheet Metal	$ 865,000	$ 782,300	$ 82,700
Architectural Sheet Metal	523,450	435,600	87,850
Special Fabrication	210,870	179,240	31,630
Heating	550,000	450,300	99,700
Air Conditioning	200,680	150,060	50,620
Company Totals	$2,350,000	$1,997,500	$352,500

Each "department" of work performed by a company consists of a number of jobs that are of that basic type. Whether a type of work is particularly profitable or unprofitable depends on what happens on each job that falls within that particular category. Thus, meaningful job cost information must be arranged so that profitability can be analyzed, not only on the basis of the overall company (Income Statement) or the different kinds of work (Departmentalized Income Statement), but for each individual job performed in each period. ***Exhibit 4*** reflects Sample Sheet Metal Contractor's profitability from heating jobs on a job by job basis. Take note that the total revenue, costs and gross profit from all of the jobs ties to the Departmental Income Statement (Exhibit 3).

Exhibit 4

Sample Sheet Metal Contractor
Earnings from Heating Jobs
Year Ended December 31, 199x

Job Name	Revenue Earned	Cost of Construction	Gross Profit
Farmingdale Exec. Cntr	$ 256,780	$211,100	$45,680
TGIF Restaurant	87,650	75,600	12,050
7th Street Office Plaza	156,460	128,300	28,160
Smith Residence	12,360	9,760	2,600
Maintenance	36,750	25,540	11,210
Company Totals	$550,000	$450,300	$99,700

Whether a particular job is profitable or unprofitable depends not only on how much cost was incurred, but also what "types" of costs were incurred. Consequently, job cost information should reveal the amount of cost in the job by category of work performed, such as labor, material, equipment, subcontracts and all other costs which can be assigned to the job. Therefore, in keeping with the stairstep logic, job cost information should allow for identification of how much was spent for each category of cost within each job as shown in ***Exhibit 5***.

Exhibit 5

Sample Sheet Metal Contractor
Earnings from Farmingdale Executive Center
Year Ended December 31, 199x

Revenue		$256,780
Cost of Construction		
Labor	$96,750	
Material	85,720	
Subcontractors	20,090	
Other Job Costs	8,540	
Total Cost of Construction		$211,100
Gross Profit		$ 45,680

Particularly on larger jobs, sheet metal contractors should be able to identify cost by where in the job these costs occur. This can be identified as a phase. As you can see in ***Exhibit 6***, by phase we simply mean some designated cubic area of the total job or some process of the job performed off the job such as shop fabrication.

Exhibit 6

EXAMPLE PHASE COST ELEMENTS

Phase No.	Description
101	Floor #1
102	Floor #2
103	Floor #3
104	Floor #4
105	Floor #5
201	Building #1
202	Building #2
203	Building #3
301	Plan Section #1
302	Plan Section #2
401	Equipment Room #1
402	Equipment Room #2
900	General Conditions

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The next step on the job costing ladder is the activity or cost code level. Job activities refer to the type of work being performed by the personnel on the job. ***Exhibit 7,*** lists some typical activities such as moving materials, hanging duct, installing equipment, wrapping duct, etc. To keep cost information divided according to activity within a phase, we, in effect treat each phase as a separate job and collect the costs of each activity done within each phase. This type of costing would permit each activity to be measured for every floor or some other portion of the job.

Exhibit 7

Example Phase Cost Elements

Activity No.	Description	Unit Measurement
100	Fabricate Metal Duct	Sq. Ft. (or Pounds)
102	Fabricate Fiberglas Duct	Sq. Ft.
104	Line Duct	Sq. Ft.
110	Erect Duct – Below Ground	Ft.
112	Erect Duct – on Surface	Ft.
114	Erect Duct – on Ladder	Ft.
116	Erect Duct – on Scaffold	Ft.
130	Wrap Duct – on Surface	Ft.
150	Piping – Refrigerant	Ft.
152	Piping – Gas	Ft.
154	Piping – Water	Ft.
160	Set Equipment	No. of Hours
170	Check Test and Start	No. of Hours
175	Balancing	
200	General Conditions	
210	Supervision	
220	Travel and Subsistence	
230	Delivery	

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The most detailed level of job costing is the unit cost. Unit cost refers to the total cost required to perform some tangible measure of work as shown in ***Exhibit 8***. Different sizes of duct, lined or unlined, wrapped or unwrapped, round or rectangular, installed below ground, within six feet above the floor, or at ladder or scaffold height may all be characteristics of the units.

Exhibit 8

EXAMPLE UNIT COST ELEMENTS

Unit No.	Description	Unit of Measurement
	Ducts:	
101	6" x 18"	Ft.
102	8" x 12"	Ft.
103	10" x 16"	Ft.
110	Fire Dampers	
111	24" x 24"	Count
112	25" x 25"	Count
	Registers and Grilles	
120	To 2 Sq. Ft.	Count
121	2 - 4 Sq. Ft.	Count
	Flexible Connections:	
131	Canvas	Ft.
132	Rubber	Ft.
133	Asbestos	Ft.
	Round Duct (Insulated)	
141	6"	Ft.
142	8"	Ft.
143	10"	Ft.

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Unit costs can be used to measure the total cost of alternative materials, alternative methods of fabrication, or alternative methods of erection for those different materials installed on the job. Unit costs may be expressed as dollars per pound of a specific of each piece of installed material on the job, dollars per square foot of a particular floor or area of a building, dollars per lineal foot of a specific duct line, or any other total cost dollars per measurable cost unit.

In summary, the term "job costing" has many dimensions and can be used on any or all of the costing "stair-steps". Unit costs on a particular job can be used to measure the cost of the installed unit of material. Activity costing can be used to measure the actual cost of the different activities involved in the job. Phase costing summarizes the total cost of the activities and units within each phase of the job. Total cost tells us the amount of materials, labor, etc. as well as the gross dollar cost of the job. By summarizing the cost of similar jobs, we can determine departmental (type of job) costs and, therefore, measure the profitability of different kinds of work. Finally, all kinds of work performed in the period can be summarized in the profit and loss statement of the company for that period.

With this wide array of costing steps available, it is essential that the requirements of each company be considered before a job costing system is chosen. Remember, many steps of job cost information can be used. In choosing what levels of cost information are needed for your company it is important to examine your company's specific operations both in the field and in the office. The remainder of this manual will discuss cost information applications and reporting to assist you in establishing and operating a job costing system which best fits your individual company's needs.

Costing Starts With the Estimates

One of the most important uses of job cost information is to compare estimated costs with actual costs. Comparison of actual and estimated costs can lead to improved accuracy in the estimating of future jobs and to the detection of probable cost overruns (or savings) while the job is in process. With this in mind, the first principle of a good job costing system is a good estimate arranged in the same cost categories used in accumulating actual job cost information.

The following exhibits present some typical estimate summary formats which can be used to begin comparing actual to estimated job costs, for the various combinations of job, phase, activity and unit costing. It is assumed that these formats are merely summaries of the actual takeoffs and extensions which would have been prepared before the estimate summary is finalized.

Exhibit 9 shows a typical estimate summary for a job on which only direct cost totals will be tracked. Exhibit 9, typically would be used for small jobs where simple totals of each direct cost category (labor, material, equipment, subcontractors and other direct costs) will be sufficient for controlling the job cost while the job is in progress and for increasing estimating accuracy after the job is completed. This format allows for no activity or unit costing on the job since the estimate summary is not recapped in an activity or unit format.

Exhibit 10 shows an example estimate summary for a job on which phase costing will be used. A job of multi-stories or multi-building or even multi-zones can be summarized by those various phases to allow for estimated versus actual comparison while the job is in process and after completion. By using the phase costing format, you can estimate each phase of the job as if it were a separate job. Using this type of format you may be able to pinpoint cost overrun problems on a particular phase, enabling you to take corrective action on future phases instead of waiting until the job is completed.

Exhibit 11 shows a typical estimate summary for a job on which activity costing will be used. For each designated activity on the job, the estimator enters the direct costs identified for the respective columns and then totals each line to establish a total for each of the activities being estimated.

Exhibit 9

ESTIMATE SUMMARY

DIRECT COST TOTALS ONLY

Department ____________________

Job Name ____________________ Date ____________________

Job No. ____________________

Direct Costs:

Equipment $ ____________

Materials ____________

Labor ____________

Subcontracts ____________

Other Direct Costs:

____________________ ____________

____________________ ____________

____________________ ____________

____________________ ____________

Total Direct Costs ____________

Overhead

____________ % Eqpt. ____________

____________ % Materials ____________

____________ % Labor ____________

____________ % Subcontracts ____________

____________ % Other Direct Costs ____________

Total Overhead Applied ____________

Total Cost ____________

Net Profit ____________

Job Price ____________

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Exhibit 10

ESTIMATE SUMMARY
PHASE COSTING FORMAT

Job No. ____________ Estimator ____________

Job Name ____________ Department ____________ Date ________

Phase Description		Job Administration	Floor 1	Floor 2	Floor 3	Floor 4	Floor 5	Rooftop	Eqpt. Room	TOTAL
Direct Costs:	Phase No.									
Equipment										
Materials										
Labor										
Subcontracts										
Other Direct Costs										
Total Direct Cost										

Overhead: _______ % Equipment	
_______ % Materials	
_______ % Labor	
_______ % Subcontracts	
_______ % Other Dir. Costs	

Total Overhead	
Total Cost	
Net Profit	

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Exhibit 11

ESTIMATE SUMMARY
ACTIVITY COSTING FORMAT

Job Name ______________________________

Job No. ______________________________

Dept. ________________

Date ________________

Estimator ________________

Activities Description	No.	Equipment	Materials	Labor	Subcontracts	Other Direct Costs			TOTAL
TOTAL									

Overhead: _______ % Equipment	
_______ % Materials	
_______ % Labor	
_______ % Subcontracts	
_______ % Other Direct Costs	

Total Overhead	
Total Cost	
Net Profit	
Job Price	

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Notice that Exhibits 10 and 11 are interchangeable. You may use whichever layout you prefer by simply interchanging the words "activity" and "phase" shown on the two forms. The determination of the most desirable form for your company should be established on the basis of your company's needs and the preferences of your operating personnel, before the forms are put in final form.

Exhibit 12 shows a typical format for an estimate summary for a job on which both phase and activity costing will be used. Remember that each phase is treated as a separate job for determining the total direct cost. Thus, step one is to establish the job phases that will be used in estimating and tracking actual costs for the job. The second step is to determine each activity that will be included in each phase.

A typical estimate summary for unit costing is shown in ***Exhibit 13.*** Notice that the form is identical to Exhibit 12 except that a quantity column has been added. The columns of Exhibit 12 can be used to estimate the direct costs of each unit and those amounts then multiplied by the number of units to determine the grand total. With this approach actual quantities performed on the job can be compared to estimated quantities, enabling you to monitor the unit cost of performing a particular activity for updating your estimating data base. While the job is in process, this type of job costing system may assist in pinpointing problem areas in unit costing or labor productivity early enough so that corrective action can be taken.

Exhibit 14 shows an estimate summary format for a job on which both activity and unit costing will be used. It is designed so that you can collect unit costs within activity as shown in the example or, if you prefer, you can collect activity cost within units. This change can be accomplished by merely switching the major and minor headings (activity and unit) in the example format. As an example of when you might prefer to collect activities within units, consider the cost of "lining a duct" (an activity) where the cost of fabricating a section of duct of a specific size is your unit basis.

Exhibit 12

ESTIMATE SUMMARY
PHASE AND ACTIVITY COSTING

Job Name ____________________

Job. No. ____________________

Dept. ________________

Date ________________

Estimator ________________

Activities Description	No.	Equipment	Materials	Labor	Subcontracts	Other Direct Costs			TOTAL
Phase ________:									
(Activity) _____									
(Activity) _____									
(Activity) _____									
(Activity) _____									
(Activity) _____									
Phase Total									
Job Total									

Overhead: _____ % Equipment	
_____ % Materials	
_____ % Labor	
_____ % Subcontracts	
_____ % Other Direct Costs	

Total Overhead	
Total Cost	
Net Profit	
Job Price	

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Exhibit 13

ESTIMATE SUMMARY
UNIT COSTING FORMAT

Job Name ____________________

Job No. ____________________

Dept. ____________________

Date ____________________

Estimator ____________________

Unit Description	No.	Quantity	Equipment	Materials	Labor	Subcontracts	Other Direct Costs			TOTAL
TOTAL										

Overhead: ______ % Equipment	
______ % Materials	
______ % Labor	
______ % Subcontracts	
______ % Other Direct Costs	
Total Overhead	

Total Cost	
Net Profit	
Job Price	

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Exhibit 14

ESTIMATE SUMMARY
ACTIVITY AND UNIT COSTING

Job Name ______________________

Job No. ______________________

Dept. ______________

Date ______________

Estimator ______________

Activities Description	No.	Quantity	Equipment	Materials	Labor	Subcontracts	Other Direct Costs			TOTAL
Activity________:										
(Unit) ________										
(Unit) ________										
(Unit) ________										
(Unit) ________										
Activity Total										

Job Total										

Overhead: ______ % Equipment	
______ % Materials	
______ % Labor	
______ % Subcontracts	
______ % Other Direct Costs	

Total Overhead	
Total Cost	
Net Profit	
Job Price	

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Exhibit 15 shows an example format in which phase, activity and unit costing are all used. The format shows unit cost measurements within each activity within the various phases. Although it may be extremely cumbersome to maintain this level of detail on an entire job, it may be useful to use this type of format in making selective cost studies within a particular job or set of jobs.

The previous exhibits showed a variety of different formats that can be used for accumulating and reporting on job cost information. The extent of the detailed cost information that you build into your actual job costing should consider the size and scope of the particular job. Obviously, those jobs which run over several months lend themselves to a more detailed costing system. Those completed within a few weeks may not generate problem areas sufficiently early to affect any corrective action.

In addition to the project's size and scope specific questions should be asked concerning the type of system adopted. Are the job totals for equipment, materials, labor, etc. sufficient? Do you need those cost types for various phases of the job? Do you need to measure the cost of various activities (either independently or within phase)? Or do you also need actual versus estimated cost on various units of work on the job? In answering these questions it is necessary to consider the information that you need to know for both controlling the job while it is in process and measuring the final costs of a completed job to increase your estimating accuracy on future jobs.

Remember, that the first principle of good job cost information is a good estimate arranged in the same cost categories used in accumulating actual job cost information. In a future section of this manual, procedures for accumulating job cost information will be explored.

Exhibit 15

ESTIMATE SUMMARY
PHASE, ACTIVITY, AND UNIT COSTING

Job Name ______________________ Date __________ Job No. __________

Department ______________________

Phase :	No.	Quantity	Equipment	Materials	Labor	Subcontracts	Other Direct Costs		TOTAL
Activity ______:									
Unit ______									
Unit ______									
Unit ______									

Activity ______:									
Unit ______									
Unit ______									
Unit ______									

Activity ______:									
Unit ______									
Unit ______									
Unit ______									

Phase Total									

Job Total									

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The Computer as a Job Cost Tool

The procedures involved in establishing the specific form of the estimate summary used to accumulate actual costs is the same in a computerized system as those performed in a manual job costing system. Because of the integration and reporting capabilities in a computerized environment, the capability of expanding the level of cost accumulation is expanded.

For example, in order to maintain detail of all transactions to multiple phases, activities and units in a manual system, you need to develop a record keeping system that can accumulate costs by each cost category which can often be extremely cumbersome.

In a computerized system on the other hand, the data is accumulated in the cost categories identified when the payroll, accounts payable, inventory and/or purchase order information is entered into the computer.

By computerizing your job costing, you are not automatically afforded the benefits of expanded cost categories. A computerized job cost accounting system can be an excellent tool to categorize costs into more detailed breakdowns which will assist management in making decisions however, the categorization is only as good as the information that is reported on the time sheet, vendor invoice or purchase order.

It is extremely important to develop policies and procedures for collection of accounting data in order to obtain the full benefits that can be afforded by expanding the cost coding structure. Forms such as those identified in the "Operating the Job Costing System" section of this manual should be used to collect accurate information for entry into the computer.

The method by which phase, activity and unit cost information is accumulated will vary by software package. Some computerized accounting systems will track costs to a single level while others provide the capability of accumulating costs by phase, activity, unit cost and cost type.

Computerized Estimating

The largest benefit of a computerized estimating system is in increased speed and accuracy. Looking up of prices and calculating extensions are functions that are easily performed in a computerized environment. By speeding up the tedious calculation processes, a computerized system will enable the estimator to produce more estimates in less time. In addition, with a computerized estimating system more time is available to spend analyzing the estimate.

Many computerized estimating systems will also automate the takeoff function. By using computer hardware devises such as a digitizer or probe, plans can be automatically taken off, entered into the computer, priced and reported on. Many summary and detail reports are by-products of the estimating function instead of having to be manually created.

The information included within your estimate is usually in much greater detail than the information that is needed to track within the job cost accounting system. Irrespective of whether or not the computerized estimating is integrated with the job cost accounting, it is important to be able to obtain estimate summaries from the computerized estimating software in a format that can be used by the job cost accounting system.

In the following Job Estimate Summary Report ***(Exhibit 16)***, note how details of the estimate are summarized for entry into the job cost accounting system. Within the estimating program, the contractor takes off a number different material items in estimating the cost of material for the job. These material costs are then summarized into the particular phases and cost codes that will be tracked thru the job cost accounting system.

Exhibit 16
Sample Sheet Metal Contractor
Job Estimate Summary Report

Estimate No.: EST1050
Estimator: Smith
Customer: Mamouth Construction
Project Name: Executive Office Center
Project Location: Route 33, Freehold, NJ
Estim. Start Date: January 31, 1990

Phase	Cost Code	Cost Type	Item Code	Description	Unit of Measure	Quantity	Unit Cost	Extended Cost	Job Cost Estimate
100	101	Labor	JM2	Journeyman Labor	Hour	50.00	22.50	1,125.00	
			AP1	Apprentice Labor	Hour	25.00	18.75	468.75	
			FM	Foreman Labor	Hour	25.00	28.75	718.75	
Cost Type Total						100.00			2312.50
100	101	Material	S22987	Metal	Feet	1000.00	4.26	4,260.00	
			A12533	Blk Coupling 3"-77E	Each	75.00	12.85	963.75	
			B02256	San Tee-Reg-NH 3x1	Each	50.00	4.69	234.50	
			B02257	San Tee-Reg-NH 2x1	Each	40.00	4.20	168.00	
			E93887	Elbow-45 Deg	Each	30.00	3.20	96.00	
			E93802	Square Elbow	Each	20.00	4.10	82.00	
Cost Type Total									5804.25
Cost Code Total									8116.75
100	102	Labor	JM2	Journeyman Labor	Hour	75.00	22.50	1,687.50	
			AP1	Apprentice Labor	Hour	32.00	18.75	600.00	
			FM	Foreman Labor	Hour	50.00	28.75	1,437.50	
Cost Type Total						157.00			3725.00
100	102	Material	S22995	Metal	Feet	1200.00	4.89	5868.00	
			B02256	San Tee-Reg-NH 3x1	Each	65.00	4.69	304.85	
			B02257	San Tee-Reg-NH 2x1	Each	30.00	4.20	126.00	
			E93889	Elbow-45 Deg	Each	50.00	3.35	167.50	
			E93802	Square Elbow	Each	16.00	4.10	65.60	
Cost Type Total									6531.95
Cost Code Total									10256.95
Phase Total									18373.70

Computerized Job Cost Accounting

With a computerized job cost accounting system, manual accounting processes can be completed quickly and accurately. For example, when you process invoices and payments in a computerized job cost accounting system, all you need to do is enter information from the invoice relating to where the costs should be posted and press a key. The information is then automatically posted to your Purchase and Cash Disbursements Journals, Vendor Ledger, Job Cost Ledger and General Ledger. Most systems will even immediately warn you of potential overbilling.

A computerized job cost accounting system will also assist in freeing up your accounting staff so they have more time to tackle productive tasks, such as producing timely and accurate information for management review. Many sheet metal companies that have computerized their job cost accounting functions have found that the quality of work is higher, the number of mistakes fewer, the turnover of employees reduced and the general morale in the office has improved. In addition, many companies have found that by computerizing their job cost accounting operations they were able to grow substantially without having to increase the number of people involved in accounting functions.

A computerized job cost accounting system makes it easier for the manager of a sheet metal company to closely manage incoming and outgoing cash. Decisions on whether or not to accept a job can be based not only on profit margin, but also on the cash flow position of the company.

Operating the Job Costing System

There are a number of different accounting operations which feed actual cost information into the job costing system. These include Purchasing, Payroll and Inventory. This section of ***Principles Of Job Costing*** will identify forms and procedures which when implemented will assist your company in collecting accurate job cost information.

Material Purchasing

The best way for a sheet metal contractor to gain control over their material costs is to establish a good purchase order control system. Under such a system, the material costs are captured even before the materials are delivered or the invoice arrives.

Benefits of a Purchase Order System

There are many benefits to the establishment of a Purchase Order control system. Most importantly, by issuing Purchase Orders and committing costs, a contractor has the opportunity to begin to look at his job costs even before the invoice arrives. The quicker the contractor can see his costs, the more opportunity he has to take corrective action.

Another benefit of a Purchase Order system is the ability to lock in prices. Most suppliers will guarantee a price of materials when the PO is issued. By locking in prices while they are low, material costs can be significantly reduced during periods of rising prices.

A third benefit of establishing a Purchase Order control system is in the area of planning. A good PO system can assist both the contractor and supplier in planning of material deliveries. A supplier who knows that they have a sheet metal order to deliver to ABC Sheet Metal Contractor in 30 days can do a better job of planning his stock so that he will have the entire order on hand when the contractor is ready to receive delivery. By issuing Purchase Orders and linking delivery to the job schedule, a contractor can have better control over the scheduling of his labor and subcontractors.

Use of Purchase Orders can also assist in the area of cash flow planning. Having advance knowledge of the dollar amount and anticipated timing of purchases can assist in the planning of cash requirements.

Sheet Metal contractors that issue Purchase Orders to their suppliers find that they are able to get better prices for material from their suppliers than those contractors that do not issue POs. By planning and issuing POs the contractor may be in a better position to make a volume purchase of materials for use on several jobs. In addition, by knowing the quantity of material that a contractor will need ahead of time, the supplier also has the opportunity to make volume purchases and pass on the price discounts to the contractor.

Computerized Purchasing

A computerized system can be used to print and track outstanding Purchase Orders by vendor and by job. Using the following PO Report for Jobs ***(Exhibit 17)***, a sheet metal contractor can quickly see the balances outstanding on each purchase order issued for a specific job.

In addition to identifying the status of each item on the Purchase Order (ordered, backordered, and received), the PO Report for Jobs identifies the cost distribution (cost code) where the material will be posted when it is received.

Exhibit 17
PO Report For Jobs

Job Number: 2
Vendor Name: General Supply Company
Job Name: Executive Office Center
P.O. Number: 12345

		Date			Quantity					
Site No.	**Description**	**Order**	**Ship**	**Line No.**	**Ordered**	**Back-Ordered**	**Unit Price**	**$ Total**	**Qty Recv'd**	**Cst Cde**
01-101	R21 Insulation	12/30/89	01/15/89	1	3000.00	0	0.15	450.00	0.00	102
02-103	Blk Coupling 3"-77E	12/30/89	01/15/89	2	50.00	15.00	12.85	835.00	50.00	100
02-125	PVC-SCH 40 - 1"	12/30/89	01/15/89	3	500.00	100.00	0.21	123.80	0.00	103
02-256	San Tee-Reg-NH-3x1-1/2	12/30/89	01/15/89	4	100.00	0.00	4.69	469.00	50.00	102
01-102	R12 Insulation	12/30/89	01/15/89	5	1000.00	150.00	0.07	80.00	0.00	102
02-126	PVC-SCH 40 - 1-1/2"	12/30/89	01/15/89	6	1500.00	1500.00	0.18	542.20	1000.00	103
					6150.00	1765.00		2500.00	1100.00	

Processing of Material Invoices

When a material invoice is received it should stamped with the date received. In addition, a processing stamp should be prepared and entered onto the invoice. This stamp should include areas for all pertinent invoice information. An example of some of the information that you may want to put on the stamp are:

- General Ledger account number
- Job Number
- Job Cost code
- Due Date
- Discount Date
- Discount Available
- Invoice Amount
- Purchase Order Number
- Approvals
  - Clerical accuracy
  - Quantity and quality (usually field personnel)
  - Secondary approval (required on all invoices over $ X)

Use of this stamp will expedite invoice processing and remind the contractor as to the steps that need to be accomplished in processing the invoice.

Following are some procedures that should be followed in processing material invoices prior to their entry into the job cost accounting system.

1. Invoices should first be reviewed for clerical accuracy. All extensions should be checked. Even if the invoice was prepared on a computer, the accuracy should be verified. Extension errors due to misplaced decimal points or inaccurate conversion factors can even occur in computer generated invoices. If the contractor is responsible for paying sales tax, both the rate and amount should be verified.
2. The Job number and cost coding information should then be entered onto the invoice. This step is not necessary if the contractor has established a Purchase Order system and the

cost coding information has been entered onto the PO. Depending upon the size of the organization, the job cost coding should be performed by either the project superintendent, estimator or project manager. If the field personnel have the responsibility of entering the job cost codes, the codes may be entered on the receiving ticket before it is sent into the office for processing.

Whoever in the organization is responsible for ordering the materials should also be responsible for approving the unit price of the material if Purchase Orders are not used. In an Purchase Order environment, accounting should be responsible for matching the unit price on the Purchase Order against the invoice.

3. Accounting should match the invoice to the receiving ticket to make sure that the quantity of material invoiced was actually received. Many times, the unit of measure for the material that is delivered differs from the unit of measure included on the invoice or the material description between the invoice and receiving ticket varies. Contractors should demand that their supplier provide them with invoices and receiving tickets that contain the same units of measure and material descriptions.

The procedures involved in processing subcontractor invoices are similar to those used in processing material invoices. The main difference is in the case of a subcontractor billing, the project manager or superintendent should review each billing to determine whether or not the subcontractor has completed the work being billed for. In addition, the accounting department should compare the contract and previous billing amounts on the invoice to the subcontract's file.

After the invoices have been processed they should be entered into the job costing system. In a manual system, this entails posting the information to a Purchase Journal, vendor subsidiary ledger and job costing.

Computerized Invoice Entry

You will note in the following example of a sample invoice entry screen from a computerized job cost accounting system ***(Exhibit 18)*** that the contractor simply entered a unique number assigned to the vendor from whom the invoice was received, the invoice number, amount and date. All of the remaining information (vendor name, due and discount dates and General Ledger account numbers) was automatically computed by the software based upon information about the vendor that was entered only once.

Exhibit 18

Enter New Invoices				**Sample Contractor**
Vendor Number: Premier **Invoice Number: 123**		**Premier Steel Corporation**		
Invoice Amount	2543.00	Invoice Date	12/29/89	
Invoice Description	Premier Steel Corp.	Due Date	01/28/90	
Type	@ Invoice	Discount Dat	01/08/90	
Payment Status	@ Normal	Accounts P=yable		2010
		Retention Payable Account		2010
Type		Discount Dat		
Payment Status		Prepaid Check No.		
Is the above information correct? @ Yes				
1Help 3GoBack 4Menu 5GoFwd 6GoTo 7Copy 8Delete				

After entering the basic invoice information, the contractor simply enters the job where the material is to be charged, the amount distributed (if the invoice was for material used on several different jobs or cost distributions) and the description and quantity of material purchased. All of the remaining information is automatically calculated by the software. ***(Exhibit 19)***

Exhbit 19			
Enter New Invoices			**Sample Contractor**
Vendor Number: Premier **Invoice Number: 123**		**Premier Steel Corporation**	
Balance	**2543.00**	Line Item #1 is for @Supplies	
Job	Exec		
Phase	300		
Cost Code	3050		
Cost Type	@ Material		
Item		**Discount**	
Description	Duct Materials	Percentage	1.50
Amount	2543.00	Amount	38.15
Account	5020	Account	5040
Quantity	1500.00		
Is the above information correct? @ Yes			
1Help 3GoBack 4Menu 5GoFwd 6GoTo			

After the invoice information is accepted by the system, the costs and related data are posted to the job, General Ledger and Vendor Ledger. The key to this speed and error reduction is in the fact that the accounting operations are integrated. Information is entered into the system one time and then automatically distributed to the applicable accounting journals and ledgers.

As a result of this integration, reports which can assist a sheet metal contractor in controlling costs are immediately available once the information has been posted. A variety of computerized reports that will assist in controlling job costs are discussed in the section on Job Cost Reporting in this manual.

In addition to speeding up the processing of vendor invoices, an integrated Accounts Payable module can be used to automate the process of printing checks, 1099's and other applicable vendor related tasks.

A major by-product of computerized accounts payable is up to date reporting of the money owed to vendors and subcontractors. Open Payables reports are usually sorted by vendor, by due date or by job. These timely reports will assist a manager of a sheet metal company in making the most of the company cash flow and taking the best advantage of available discounts.

The following Open Payables by Job report ***(Exhibit 20)*** can be used by a sheet metal contractor to analyze the amount owed for materials purchased and subcontractors used on a specific job. This information can be used to help plan cash requirements on a job by job basis.

Exhibit 20
SampleContractor
Open Payables by Job

Phase	Cost Code	Vendor Number	Invoice No.	Item Description	Invoice Date	Due Date	Invoice Amount	Paid To Date	Ret'n Due	Net Due	Paymnt Status
Job Number: Sheet Executive Office Center											
200-	-A	BW&Son	98772	Delivery of Equip.	12/15/89	01/15/90	250.00	0.00	0.00	250.00	Normal
Vendor Totals:							250.00	0.00	0.00	250.00	
200-	-A	Lion	1289	Engineering Serv.	12/01/89	12/31/89	115.00	0.00	0.00	115.00	Normal
Vendor Totals:							115.00	0.00	0.00	115.00	
104-101	-M	Lumber	89220	Partial Shipment	12/15/89	01/30/90	342.30	0.00	0.00	342.30	Normal
Vendor Totals:							342.30	0.00	0.00	342.30	
100-101	-M	Premier	123	Duct Material	12/15/89	01/14/90	1690.30	0.00	0.00	1690.30	Normal
100-102	-M	Premier	123	Partial Shipment	12/15/89	01/14/90	852.70	0.00	0.00	852.70	Normal
100-101	-M	Premier	187	On Account	12/30/89	01/29/90	1789.10	0.00	0.00	1789.10	Normal
100-102	-M	Premier	187	Partial Shipment	12/30/89	01/29/90	1486.90	0.00	0.00	1486.90	Normal
Vendor Totals:							5819.00	0.00	0.00	5819.00	
Job Totals for Job Sheet Executive Office Center							6526.30	0.00	0.00	6526.30	
Grand Totals:							6526.30	0.00	0.00	6526.30	

Processing of Labor Hours

Reporting of Hours Worked

Accurate reporting of hours worked is critical to controlling labor costs. Not only is it key to have good record keeping of total hours but it is extremely important to obtain a breakout of hours worked by work item or cost code.

In designing the documents to be used to accumulate the number of hours worked, it is important to consider the fact that this information will be used both to process the employees paycheck and to enter information into the Job Cost records.

There are two different approaches to the reporting of hours worked. They can be reported by employee or by job. Contractors that have employees moving around from job to job should develop a system of reporting hours worked by employee. For those firms whose jobs are more long term and whose employees are not constantly moving between jobs, hours worked should be reported by job.

Reporting by Job

Hours worked by cost code should be reported on a daily basis. Each foreman or project superintendent should be completing a Daily Time Report such as the ones in ***Exhibit 21*** listing the hours worked by each employee at each phase, activity and/or unit cost. If an employee is working at multiple crafts, which are paid at different rates during the day, they should be listed on the timecard separately for each craft. In order to reduce errors in the cost coding of hours worked the standard cost codes used on that job along with a description of the code can be pre-printed on the form.

Exhibit 21
Daily Time Distribution Sheet

Foreman ______________________________

Project ______________________________

Contract No. __________________________

Job No. ______________________________

Date ________________________________

DESCRIPTION OF WORK OR CODING

Badge No.	NAME	Class						Hrs.						Total Hours			

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Reporting by Employee

For contractors that have employees constantly running between different jobs it may be more efficient for hours to be reported by employee. Employees should prepare a daily time report listing the jobs and cost codes that they have worked on such as that presented in ***Exhibit 22.***

Smaller construction firms may want to use weekly timesheets for reporting of hours worked such as the one presented in ***Exhibit 23***. If weekly timesheets are used, the employee should be responsible for completing the timesheet at the end of each day. It is easy for an employee to remember the number of hours worked in a given day but hard to look back and record the task that you worked on at the beginning of the week. Employers should spot check to ascertain that the employee is entering their time on the timesheet on a daily basis.

Reporting on Productivity

By adding the reporting of productivity information into the process of reporting hours worked, a contractor can gain even better control over labor costs. Productivity reporting involves the tracking of work completed at a given cost code. It should be reported in units and should correspond to the method that the contractor is using to estimate the job. A form such as the Weekly Quantity Report presented in ***Exhibit 24*** can be used by the job supervisor for reporting of work completed.

Verification of Hours Worked

Reporting of hours worked should be the responsibility of the person who is responsible for overseeing the specific work area. On larger jobs this person may be the job foreman who in turn will report to the superintendent. On smaller jobs, the superintendent or project manager may oversee the entire job.

The superintendent or project manager should be responsible for verification of hours worked and cost codes on a weekly basis. The project manager should indicate that he has reviewed and approved the timesheets prior to the delivery of the timesheets to the payroll department. In addition, company management should perform spot checks to ascertain whether or not hours are being properly reported.

Exhibit 22
Daily Time Report By Employee

NAME ____________________

JOB NO. ____________________

DATE ____________________

WEEK ENDING ____________________

			UNIT CODE															TOTAL HOURS
			ACTIVITY CODE															
			PHASE CODE															
PHASE CODE	BADGE NO.	NAME	TOT HRS															
			Prem															
			Tot															
			Prem															
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Prepared By ____________________ Approved By ____________________

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Exhibit 23
Weekly Labor Cost Report

EMPLOYEE____________________ JOB NAME ____________________

JOB NUMBER____________ MAN NUMBER ____________ PERIOD ENDING ____________

DESCRIPTION OF WORK	COST CODE	SPECIAL RATE	TOTAL HOURS	TYPE PAY	SUN	MON	TUE	WED	THUR	FRI	SAT
				Regular							
				Double							
				Time ½							
				Regular							
				Double							
				Time ½							
				Regular							
				Double							
				Time ½							
				Regular							
				Double							
				Time ½							
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				Double							
				Time ½							
				Regular							
				Double							
				Time ½							
				Regular							
				Double							
				Time ½							
	TOTALS FOR WEEK			Regular							
				Double							
				Time ½							
				Spcl							

TOTALS FOR EACH DAY

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Exhibit 24

WEEKLY QUANTITY REPORT

Department ____________________

Job Name ____________________ Job No. ____________________ WEEK ENDING ____________

CODE														
UNIT OF MEASURE														
SAT. / SUN.														
MONDAY														
TUESDAY														
WEDNESDAY														
THURSDAY														
FRIDAY														
TOTAL FOR WEEK														

JOB SUPERVISOR ____________________

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Once the timesheets are sent to the office, they should be reviewed with the eye towards looking for possible errors. Possible errors should be discussed with the project manager prior to the processing of payroll.

Following is a list of some possible errors that may occur in reporting of hours worked:

1. Reporting of overtime hours when no overtime should have been worked.
2. Reporting of excessive overtime and premium time.
3. Not reporting of overtime if more that 40 hours were worked.
4. No time or the wrong time is reported for someone who is known to be working.
5. Time being reported for a person who is known not to be working.
6. Reporting of time to cost codes where work should not currently be performed.
7. Time being shifted from cost codes that are over budget to those that are still under budget.
8. Less than 40 hours are reported for an employee that usually works a full week.
9. Employees working at a craft different than the one they usually work at.

Computerized Payroll Processing

With an integrated computerized Payroll system, all you have to do is enter employee hours worked, press a key and your Payroll Journal, Job Cost Ledger, General Ledger and Employee Ledger Card will be updated. In the following example of a payroll input screen from a computerized job cost accounting system, the contractor simply enters the employee code, applicable job information, hours worked and quantity of material put in place (if the contractor wants to track labor productivity). All of the remaining information on the screen had been entered one time when the employee first started working for the contractor. See ***Exhibit 25***.

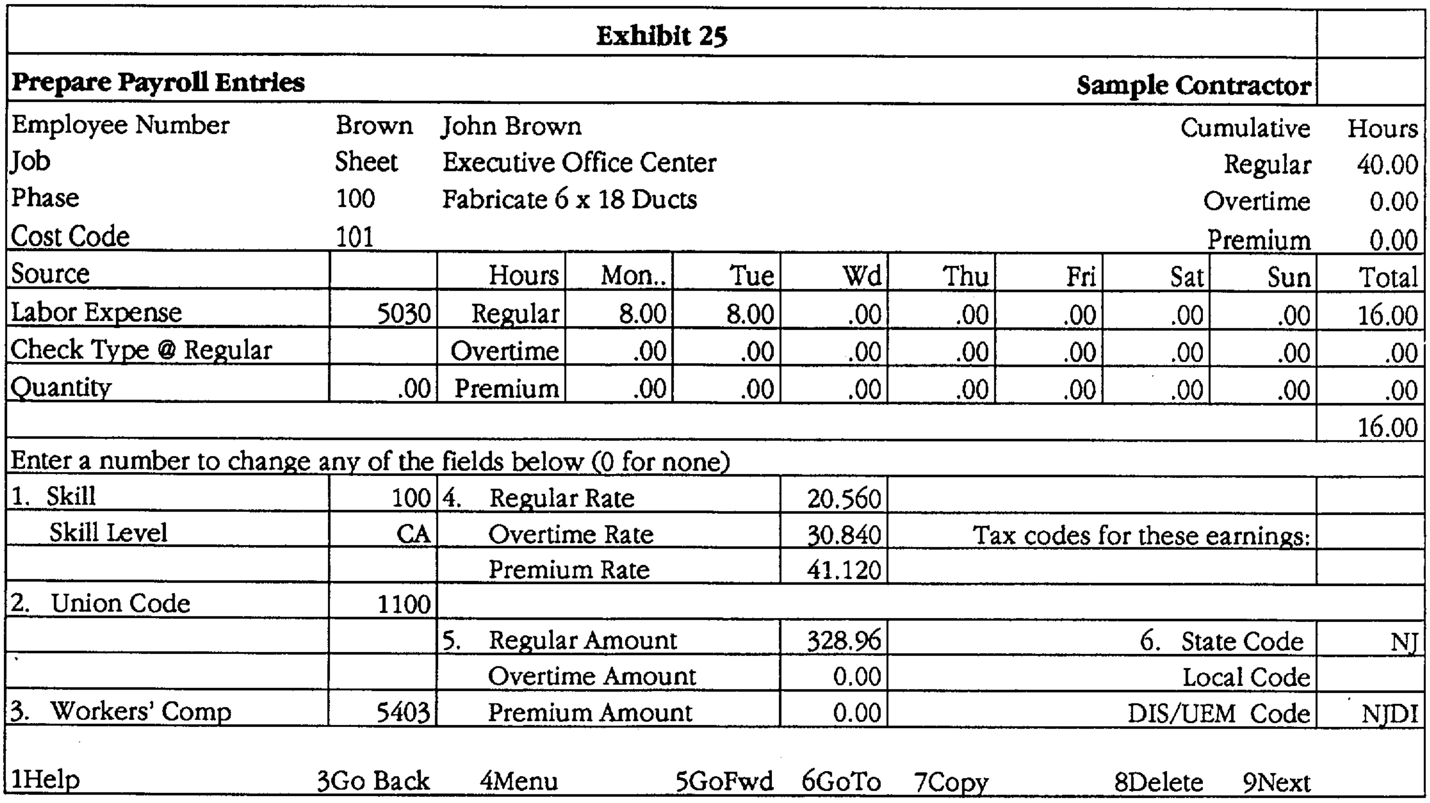

Exhibit 25										
Prepare Payroll Entries									**Sample Contractor**	
Employee Number	Brown	John Brown							Cumulative	Hours
Job	Sheet	Executive Office Center							Regular	40.00
Phase	100	Fabricate 6 x 18 Ducts							Overtime	0.00
Cost Code	101								Premium	0.00
Source		Hours	Mon..	Tue	Wd	Thu	Fri	Sat	Sun	Total
Labor Expense	5030	Regular	8.00	8.00	.00	.00	.00	.00	.00	16.00
Check Type @ Regular		Overtime	.00	.00	.00	.00	.00	.00	.00	.00
Quantity	.00	Premium	.00	.00	.00	.00	.00	.00	.00	.00
										16.00
Enter a number to change any of the fields below (0 for none)										
1. Skill	100	4. Regular Rate			20.560					
Skill Level	CA	Overtime Rate			30.840	Tax codes for these earnings:				
		Premium Rate			41.120					
2. Union Code	1100									
		5. Regular Amount			328.96				6. State Code	NJ
		Overtime Amount			0.00				Local Code	
3. Workers' Comp	5403	Premium Amount			0.00				DIS/UEM Code	NJDI

1Help 3Go Back 4Menu 5GoFwd 6GoTo 7Copy 8Delete 9Next

Most payroll systems will also compute and report on taxes, union benefits and deductions, insurance benefits and other miscellaneous benefits and deductions as a by-product of entering hours worked.

In addition to posting hours worked and actual pay to the applicable jobs, phases, activities and units, most computerized payroll systems provide the ability to automatically update Job Cost with the burden (i.e. employer's portion of payroll taxes, insurance, union and other company paid benefits) related to the employee's gross pay.

The following Job Labor Costs Register (***Exhibit 26***) identifies the employees that worked on each job (and cost distributions within the job) during the current payroll period. This report can be used to assist in analyzing the costs incurred and hours worked by your employees on given jobs and within given tasks as soon as payroll is processed.

Exhibit 26
Sample Contractor
Job Labor Costs Register
For the Period Ending 15 Jan 1990

					Hours				Dollars				
Job	Phse	Cost Code	Emp. No.	Employee Name	Reg.	Over-time	Other	Total	Reg.	Over-time	Other	Total	Adj. Amt
Sheet	100	101	Brown	John Brown	16.00	0.00	0.00	16.00	328.96	0.00	0.00	328.96	0.00
		102	Brown	John Brown	24.00	0.00	0.00	24.00	493.44	0.00	0.00	493.44	0.00
		101	Foley	Dennis Foley	24.00	2.00	8.00	34.00	483.12	60.38	161.04	704.54	0.00
		102	Foley	Dennis Foley	8.00	0.00	0.00	8.00	161.04	0.00	0.00	161.04	0.00
		101	Gibbs	Terry Gibbs	32.00	0.00	0.00	32.00	432.00	0.00	0.00	432.00	0.00
		102	Gibbs	Terry GIbbs	8.00	2.00	0.00	10.00	108.00	40.50	0.00	148.50	0.00
		102	James	Steve James	4.00	1.00	0.00	5.00	74.00	27.75	0.00	101.75	0.00
		102	Lopez	Manuel Lopez	40.00	0.00	0.00	40.00	853.60	0.00	0.00	853.60	0.00
			Phase Totals		156.00	5.00	8.00	169.00	2934.16	128.63	161.04	3223.83	0.00
	104	101	James	Steve James	12.00	0.00	0.00	12.00	222.00	0.00	0.00	222.00	0.00
		102	James	Steve James	12.00	0.00	0.00	12.00	222.00	0.00	0.00	222.00	0.00
			Phase Totals		24.00	0.00	0.00	24.00	444.00	0.00	0.00	444.00	0.00
			Job Totals		180.00	5.00	08.00	193.00	3378.16	128.63	161.04	3667.83	0.00
			Company Totals		180.00		8.00		3378.16		161.04		0.00
						5.00		193.00		128.63		3667.83	

Processing of Inventory Transactions

Withdrawal of Items From Inventory

One of the most important items in accounting for inventory costs is developing a method for accounting for items of inventory that are used on a job. Policies and procedures need to be established to account for both the quantity and cost of material on the job cost and inventory records.

When material is needed for a job, the foreman or other individual responsible for ordering materials for the job can prepare an Inventory Withdrawal Ticket identifying the material needed from inventory. The ticket should be a 4 part form similar to the one presented in ***Exhibit 27*** which will serve as both a requisition for the material as well as a shipping ticket and source document for posting information to the accounting records.

When requesting material to be withdrawn from inventory the foreman should enter both the number and description of the item that is being taken from inventory along with the quantity needed. Care should be taken in using a consistent unit of measure. Material may be stored in a different unit of measure then the foreman is requesting on the Inventory Withdrawal Ticket.

At the top of the form the foreman should enter the job number and description or location of the job, along with the date that the material is needed. As part of the scheduling and planning process, the project manager should allow enough lead time for the material to be delivered to the jobsite.

In order to ease posting to the accounting records, a different form should be used for each job that material is being removed for. In addition to entering the job number where the material is to be used, the specific cost code relating to each inventory item should be entered.

All forms should be signed by the foreman. In larger organizations procedures may be set up to require both the foreman's and project manager's signature for materials over a certain dollar amount. The Inventory Withdrawal Ticket is acting as a Purchase Order and should be treated with the same care and control as those afforded to a PO.

When the material is withdrawn from the warehouse the actual quantity removed should be entered by the person responsible

Exhibit 27
Inventory Withdrawal Ticket

Ticket Number 1001

Job Number ______________________________

Description ______________________________

Date Needed ______________________________

Item Number	Description	Unit of M	Cost Code	Quantity Needed	

Requested By: ____________________

Date: ____________________

Original

for controlling the warehouse inventory. The warehouse manager should keep the completed Inventory Withdraw Ticket as a source document for posting to the perpetual inventory records. In order to maintain accurate perpetual inventory records, it is important that postings from the inventory withdrawal tickets be made on a timely basis.

A duplicate of this form should serve as the delivery ticket (Part 3 of the Inventory Withdrawal Ticket) and should accompany the material delivered to the job site. The job foreman should treat the receipt of material received from inventory in the same manner as material received from outside vendors.

The fourth part of the form should be sent to the accounting department for use in posting the transaction to the accounting and job costing records. In addition, the copy acting as the delivery ticket should be forwarded by the foreman to the accounting department along with delivery tickets received from outside vendors.

Computerized Inventory

Due to the quantity of transactions and items within inventory, a computerized system is an excellent means of accounting for inventory costs. A computerized inventory control system will enable the sheet metal contractor to easily account for inventory transactions as well as provide additional reporting that will help in the inventory control process.

An integrated inventory system can assist in controlling costs and the location of material stored in your warehouse. In addition, inventory costs can automatically be posted to the specific job, phase, activity, and unit when it is removed from the warehouse and used on a specific project.

The following example of an inventory input screen (***Exhibit 28***) shows the transfer of an item out of inventory to a particular job. In this example, 75 elbows that have been withdrawn from inventory are being charged to job number 2, cost code 102.

Exhibit 28
Transaction Processing

```
Transaction #           2              Site:
Site-Item #             02-269         Category:
Date                    01/15/90       Dscript :         Elbow-Blk-MI-45D-2"
Reference ID                           Quantity
Price Column            1              On Hand:            900.00
Unit Price              0.550          On Order:           100.00
Quantity                75.00          Allocated:          750.00
Total Amount            41.25          Backorder:            0.00
From Allocated Y/N      N              Standard Cost:        0.500

Job Number              2              Price
Cost Code               102            Column 1:             0.550  /E
                                       Column 2:             0.600  /E
G/L Debit (Asset)       1              Column 3:             0.700  /E
G/L Credit (Revenue)                   Column 4:             0.000  /E
G/L Code Inventory      2              Column 5:             0.000  /E
G/L Code Cogs           0

 ARROWS  MOVE CURSOR   F3=CHANGE TX TYPE  F2=RECORD  F1=MENU
```

Job Cost Reporting

The control function of management consists of checking actual progress to date in comparison to planned progress to date. In other words, it is a simple process of checking up to determine where we stand now with respect to where we were supposed to stand at a particular time during the year or during the course of a job. If we simply estimate a job and do not check up on the progress of that job until it is completed, then control is impossible. We cannot control our job costs if we do not know where we stand. Merely playing hunches about how costs may be running with how we estimated them is not sufficient. In order to exercise control over job costs it is necessary to obtain meaningful reports on a timely basis.

Just as the establishment of a job cost coding system will vary from company to company and job to job, so does the format and timeliness of job cost reporting. The amount of detail within the report or the frequency of the report should be dictated by how often the information is needed and how often a good manager will use the information.

In looking at job cost reports there are three different levels of reporting that are available in most programs—summary, detail and analysis reports. If there are a number of jobs going on at the same time, it may not be necessary to analyze each job in detail on a regular basis (preferably weekly). Summary reports can be used to assist the manager of a sheet metal company to identify and further analyze jobs with potential problems.

The simplest type of job cost report is one that compares the estimated against the actual costs that are incurred on a job through a given period of time. The manually prepared Jobs in Process Report shown in ***Exhibit 29*** compares estimated to actual job cost for materials, direct labor, subcontracts and other direct costs. By including a "percent used" line, the reader can analyze the report much quicker than if only dollars were included.

By using a report like the Jobs in Process Report by Phase/Activity reflected in ***Exhibit 30***, the sheet metal contractor can examine job costs in a little more detail. By using a report such as this, job costs can be analyzed by type, phase and/or activity.

Exhibit 29

Jobs-In-Process Report

By Job

Company Name ____________________

Page _____ of _____ pages

Department ____________________

Date ____________________

Job Name	Job No.		Materials	Direct Labor	Sub-contracts	Other Direct Costs	Total Direct Costs
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					
		Estimate	$	$	$	$	$
		Actual	$	$	$	$	$
		% Used					

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Exhibit 30

Jobs-In-Process Report

By Phase/Activity

Company Name ____________ Page ____ of ____ pages

Job Name ______________________________ Date ____________

Phase ____________ Activity ____________		Materials	Direct Labor	Sub-contracts	Other Direct Costs	Total Direct Costs
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					
	Estimate	$	$	$	$	$
	Actual	$	$	$	$	$
	% Used					

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The following Job Cost Variance Report generated from a computerized job cost accounting system (***Exhibit 31***) tracks costs incurred by cost type. The actual costs incurred on labor, material, administrative and other job costs thru the report date are compared with the total estimated costs for each cost type. The variance reflects the amount that each cost type is over budget as in the case of labor in which the actual cost of $5,269.22 exceeds the estimate of $5,000 or under budget as in the case of materials costs.

Exhibit 31
Sample Sheet Metal Contractor
Job Cost Variance Report

Job Number - 3
Building 25
Fabricate and Install Air Conditioning   Project Manager: Bob Smith
1st Floor - Building 25
Customer: Main Street Associates

Phase	Cost Code	Cost Description	Quantity			Hours			Estimate	Actual	Variance
			Est.	Act.	Var.	Est.	Act.	Var.			
	-A	Aministration							2,000.00	1,245.00	755.00
	-L	Labor							5,000.00	5,269.22	269.22
	-M	Material							7,500.00	7,214.80	285.20
	-O	Miscellaneous							1,000.00	198.20	801.80
		Phase Total							15,500.00	13,927.22	1,572.78
		Job Total							15,500.00	13,927.22	1,572.78
		Company Total							15,500.00	13,927.22	1,572.78

For a project that has been completed, a report such as the one in Exhibit 31 will reflect the overall variance between the estimate and the actual costs incurred. The report does not provide any way to analyze how well the contractor is performing since it doesn't reflect any information regarding project status.

The Job Cost Variance report shown in ***Exhibit 32*** provides a further example of a simple computerized job cost report. In this

Exhibit 32
Sample Sheet Metal Contractor
Job Cost Variance Report

Job #2 - Executive Office Center

Phs	Cost Code	Cost Type	Description	Estimate	Actual	Variance
100	101	Labor	Fabricate 6x18 Ducts	1,975.00	2,050.00	75.00-
		Material	6x18 Metal Ducts	4,200.00	3,626.10	573.90
			Phase Total	6,175.00	5,676.10	498.90
	102	Labor	Fabricate 8x12 Ducts	625.00	687.90	62.90-
		Material	8x12 Metal Ducts	1,400.00	1,375.22	24.78
			Phase Total	2,025.00	2,063.12	38.12-
104	101	Labor	Line 6x18 Ducts	300.00	322.88	22.88-
		Material	6x18 Duct Liner	1,000.00	1,000.00	.00
			Phase Total	1,300.00	1,322.88	22.88-
	102	Labor	Line 8x12 Ducts	440.00	489.77	49.77-
		Material	8x12 Duct Liner	2,000.00	2,077.30	77.30-
			Phase Total	2,440.00	2,567.07	127.07-
112		Labor	Erect Duct-Surface	2,000.00	2,244.47	244.47-
			Phase Total	2,000.00	2,244.47	244.47-
114		Labor	Erect Duct-Ladder	4,500.00	4,418.00	82.00
			Phase Total	4,500.00	4,418.00	82.00
130		Material	Wrapping for Ducts	1,500.00	1,374.83	125.17
			Phase Total	1,500.00	1,374.83	125.17
	101	Labor	Wrap 6x18 Ducts	1,250.00	966.24	283.76
			Phase Total	1,250.00	966.24	283.76
	102	Labor	Wrap 8x12 Ducts	1,250.00	540.00	710.00
			Phase Total	1,250.00	540.00	710.00
150		Labor	Install Refrig. Pipe	1,800.00	510.22	1,289.78
		Material	Refrig. Pipe	1,650.00	1,425.55	224.45
			Phase Total	3,450.00	1,935.77	1,514.23
160		Labor	Set Equipment	2,800.00	825.01	1,974.99
			Phase Total	2,800.00	825.01	1,974.99
170		Labor	Check, Test & Start	1,050.00	.00	1,050.00
			Phase Total	1,050.00	.00	1,050.00
200		Admin.	General Conditions	5,000.00	2,808.72	2,191.28
			Phase Total	5,000.00	2,808.72	2,191.28

report a more detailed breakdown is used for classifying costs by phase of work. By having this greater detail the contractor is able to get a better understanding as to how he did on each phase of work that has been completed and can compute its effect on the overall project.

In this example, the contractor has completed work in phases 101 (fabrication), 104 (lining ducts), 112 (erect ducts—surface) and 114 (erect ducts—ladder) with a positive variance (under budget) of $148.36. Knowing that the job is ahead of budget at this point means that the contractor only has to be concerned with the remaining phases of work coming in on budget instead of the overall project.

Simple job cost reports such as those reflected in Exhibits 31 and 32 provide management with a view of what has happened on the job in the past in comparison to the estimate but do not assist the manager in predicting the costs to complete the job. Most computerized job cost accounting systems provide reports that assist the manager in projecting costs to complete. These reports can be helpful both in managing the job and calculating over/under billings for recognizing revenue on the percentage of completion accounting method on your financial statements.

These projected costs to complete can be calculated by any or all of the following methods:

- Field Reporting—most computerized job cost accounting systems will provide a form (such as the following Job Field Worksheet, ***Exhibit 33***), on which field personnel can enter either a percentage of completion or quantities of material put in place for each cost distribution. This information is then input into the computer and used in calculating projected costs remaining.
- Comparison of the actual quantity of material purchased for the job against the quantity of material that was estimated for the job provides a percentage of material costs incurred to date. This percentage is applied to the actual material costs incurred to project the additional costs that will be incurred for purchases of the same material item to complete the job.
- Comparison of the actual number of labor hours incurred on the job against the total estimated hours provides a

Exhibit 33
Sample Contractor
Job Field Worksheet

Job Number — Sheet
Executive Office Center

Phase	**Cost Code**	**Cost Description**	**Old % Comp**	**Qty To Date**	**New Percentage Complete**	**Quantity This Report**	**Unit of Measure**
100-101	-L	Fabricate 6x18 Ducts					
100-101	-M	6x8 Metal Ducts	100	625.00			
100-102	-L	Fabricate 8x12 Ducts	100				
100-102	-M	8x12 Metal Ducts		750.00			
104-101	-L	Line 6x18 Ducts	80				
104-101	-M	6x18 Duct Liner		100.00			
104-102	-L	Line 8x12 Ducts					
104-102	-M	8x12 Duct Liner					
112-	-L	Erect Duct-Surface					
114-	-L	Erect Duct-Ladder					
130-	-M	Wrapping for Ducts					
130-101	-L	Wrap 6x18 Ducts					
130-102	-L	Wrap 8x12 Ducts					
150-	-L	Install Refrig Pipe					
150-	-M	Refrig. Pipe					
160-	-L	Set Equipment					
170-	-L	Check, Test & Start					
200-	-A	General Conditions					

percentage of labor hours incurred to date. This percentage is applied to the actual labor costs incurred to project labor costs to complete.

- Comparison of actual costs incurred to date against the estimate provides a percentage of costs complete. This percentage is applied to the actual costs incurred to project costs to complete.
- Tracking the costs that have been committed but not yet incurred from outstanding subcontractors or Purchase Orders.

The following Summarized Job Cost to Date Report ***(Exhibit 34)*** provides an example of a summary job report that assists management in projecting the costs to complete a job. After examining this summary report, the manager can look at a more detailed analysis of the jobs that appear to have profits being eroded away.

Exhibit 34
Sample Sheet Metal Contractor
Summarized Job Cost To Date Report

Job No	Job Name	% Comp	Cost To Date Month	Cost To Date Year	Job	Projected Cost Remaining	Total Costs Projected	Original Estimate	Projected Variance
2	Executive Office	74.0%	1,585.16	26,742.21	26,742.21	9,201.21	35,943.42	34,740.00	(1,203.4)
400	Farmingdale I	48.0%	24,920.20	143,219.33	156,923.33	168,236.00	325,159.33	328,792.00	3,632.6
500	Blue's Restaurant	10.0%	8,925.22	94,322.00	94,322.00	1,235.00	95,557.00	79,235.00	(16,322.8)
502	Building 36	64.0%	4,910.20	20,615.00	20,615.00	11,623.20	32,238.20	35,920.00	3,681.8
600	Building 25	96.0%	6,729.12	13,927.44	13,927.44	543.00	14,470.44	9,250.00	(5,220.4)
	Company Total	62.0%	47,069.90	298,825.98	312,529.98	190,838.41	503,368.39	487,937.00	(15,431.3)

Looking at the information for job number 2—Executive Office Center you will note that this job has been calculated to be 74% complete and the current projected costs exceeds the original estimate by $1,203.42 (projected variance).

After examining this summary report Sample Sheet Metal Contractor should examine detailed reports on all jobs that have a projected negative variance. Analysis of the detailed reports will give the contractor a better understanding as to where the projected overruns are anticipated and analyze if any actions can be taken to turn the project around.

The following Job Cost to Date Report (***Exhibit 35***) provides an example of how a computerized job cost report can be used to assist in projecting costs to complete each phase, activity, unit and cost type (cost distribution). The projected costs remaining for each cost distribution is computed by dividing actual job cost to date by the percentage complete and subtracting cost to date. The method used by the system to calculate the percentage of completion for each category in this report is indicated by the corresponding codes:.

R = Reported percentage which is input by the user
Q = Computed by dividing the actual units used for the applicable activity by the estimated number of units.
H = Computed by dividing the actual hours accumulated on the applicable activity by the estimated number of hours
C = Computed by dividing actual costs by estimated costs.

On this report projected costs remaining are calculated by Dividing Job Cost to Date by Percent Complete and subtracting Job Costs to Date.

Looking at the Job Cost to Date Report, Sample Sheet Metal Contractor can identify the areas where the project is anticipated to be over budget. The first area of concern is the labor needed to erect the high ducts (phase 114). Even though over 98% ($4,418.00/$4,500.00) of the costs have been incurred, only 87% of the estimated hours have been expended. The system has computed that to complete the remaining 13% of the hours would cost the contractor $679.69 ($4,418/87%—$4,418.00).

Another potential problem area is the cost of the refrigeration piping material. Thru the date of this report, it costs Sample Sheet Metal Contractor $1,425.55 to purchase 80% of the refrigeration piping material. At this rate, the remaining 20% of the material will cost $356.39 putting this phase of work over budget.

By having timely job cost reports that assist in determining projected costs, a manager should be able to use this information in order to take corrective action which may turn potential cost overruns into on-budget performance.

Exhibit 35
Sample Sheet Metal Contractor
Job Cost To Date Report
Through Period 12

Job Number — 2
Executive Office Center
Fabricate and Install HVAC system
Customer: Northern Construction
Project Manager: Frank

Phase	Cost Code	Cost Description	% Comp	Estimated Cost	Cost To Date			Projected Cost Remaining
					Month	Year	Job	
100-101	-L	Fabricate 6x18 Ducts	100H	1,975.00		2,050.00	2,050.00	
100-101	-M	6x18 Metal Ducts	100Q	4,200.00		3,626.10	3,626.10	
100-102	-L	Fabricate 8x12 Ducts	100H	625.00		687.90	687.90	
100-102	-M	8x12 Metal Ducts	100R	1,400.00		1,375.22	1,375.22	
		Phase Total	100C	8,200.00		7,739.22	7,739.22	
104-101	-L	Line 6x18 Ducts	100H	300.00		322.88	322.88	
104-101	-M	6x18 Duct Liner	100R	1,000.00		1,000.00	1,000.00	
104-102	-L	Line 8x12 Ducts	100H	440.00		489.77	489.77	
104-102	-M	8x12 Duct Liner	100Q	2,000.00		2,077.30	2,077.30	
		Phase Total	100C	3,740.00		3,889.95	3,889.95	
112	-L	Erect Duct-Surface	100H	2,000.00	609.22	2,244.47	2,244.47	
		Phase Total	100C	2,000.00	609.22	2,244.47	2,244.47	
114	-L	Erect Duct-Ladder	87H	4,500.00	298.00	4,418.00	4,418.00	679.69
		Phase Total	87C	4,500.00	298.00	4,418.00	4,418.00	679.69
130	-M	Wrapping for Ducts	85Q	1,500.00	49.28	1,374.83	1,374.83	242.62
130-101	-L	Wrap 6x18 Ducts	72H	1,250.00	210.44	966.24	966.24	375.76
130-102	-L	Wrap 8x12 Ducts	40H	1,250.00		540.00	540.00	810.00
		Phase Total	67C	4,000.00	259.72	2,881.07	2,881.07	1,428.38
150	-L	Install Refrig. Pipe	33H	1,800.00		510.22	510.22	1,020.44
150	-M	Refrig. Pipe	80Q	1,650.00		1,425.55	1,425.55	356.39
		Phase Total	58C	3,450.00		1,935.77	1,935.77	1,376.83
160	-L	Set Equipment	25H	2,800.00		825.01	825.01	2,475.03
		Phase Total	25C	2,800.00		825.01	825.01	2,475.03
170	-L	Check, Test & Start		1,050.00				1,050.00
		Phase Total		1,050.00				1,050.00
200	-A	General Conditions	56C	5,000.00	418.22	2,808.72	2,808.72	2,191.28
		Phase Total	56C	5,000.00	418.22	2,808.72	2,808.72	2,191.28
		Job Total	74C	34,740.00	1,585.16	26,742.21	26,742.21	9,201.21
		Company Total	74C	34,740.00	1,585.16	26,742.21	26,742.21	9,201.21

In the above example, after seeing the potential overrun in the labor required to erect the high ducts, the manager may either want to bring in a more productive team of workers or a less expensive mix of workers to complete this phase of the project. To resolve the potential overrun in the cost of refrigeration piping material, the manager may want to take another look at the vendor from whom the material is purchased to find out if he can get a better price for the remaining material that needs to be purchased.

The following Job Cost Job Report ***(Exhibit 36)*** is another example of a detailed report that assists a contractor in projecting costs to complete for each cost distribution. Percent complete on this report is either field reported or calculated by comparing cost to date against estimated cost. In addition to showing total projected costs at completion for each cost distribution, this report compares estimated to actual unit costs.

Looking at the labor for erecting the high duct (phase 114) a manager can identify that it has cost $34.33 per hour to perform this task as opposed to an estimate of 30.00 per hour and that the unit cost of the piping material purchased to date is $3.56 compared to an estimate of $3.30.

Purchase Order Reporting

Most integrated Purchase Order systems will provide reports similar to the Committed Cost Variance Report shown in ***Exhibit 37*** which factors in the outstanding committed costs in projecting costs to complete.

In analyzing this report, the contractor will note that there are outstanding purchase orders for $372.00 of wrapping material for ducts. To further analyze what this amount relates to, the contractor can review a report similar to the PO Report for Jobs (Exhibit 17).

Since this report only reflects cost categories for which purchase orders are issued, further reports need to be reviewed to analyze the effect of items which are not covered by Purchase Orders (i.e. labor costs).

Exhibit 36
Sample Sheet Metal Contractor
Job Cost Job Report

2 Executive Office Center Contract Amount $60,000.00

	Estimated			Job to Date			Pct Comp	To Date Variance	Cost at Compl'n
	Units	$/Unit	Cost	Units	$/Unit	Cost			
100 * Fabricate Metal Duct									
Labor	100.00	25.00	2,500.00	105.00	24.86	2,610.44	100	110.44-	2,610.44
Material	1,000.00	5.60	5,600.00	1,210.00	4.74	5,740.22	100	140.22-	5,740.22
Total	1,100.00		8,100.00	1,315.00		8,350.66	100	250.66-	8,350.66
102 * Fab. Fiberglass Duct									
Labor	150.00	25.00	3,750.00	148.00	25.14	3,720.45	100	29.55	3,720.45
Material	2,000.00	3.00	6,000.00	2,000.00	3.15	6,298.53	100	298.53-	6,298.53
Total	2,150.00		9,750.00	2,148.00		10,018.98	100	268.98-	10,018.98
104 * Line Duct									
Labor	32.00	25.00	800.00	31.00	24.35	754.90	100	45.10	754.90
Material	1,000.00	.25	245.00	1,100.00	.25	276.00	100	31.00-	276.00
Total	1,032.00		1,045.00	1,131.00		1,030.90	99	14.10	1,030.90
112 Erect Duct-Surface									
Labor	80.00	25.00	2,000.00	65.00	25.16	1,635.25	82		2,000.00
114 Erect Duct - Ladder									
Labor	150.00	30.00	4,500.00	120.00	34.33	4,120.00	92		4,500.00
130 Wrap Duct									
Labor	100.00	25.00	2,500.00	48.00	26.86	1,289.33	52		2,500
Material	1,000.00	1.50	1,500.00	800.00	1.66	1,325.55	88		1,500.00
Total	1,100.00		4,000.00	848.00		2,614.88	65	.00	4,000.00
150 Piping - Refrigerant									
Labor	60.00	30.00	1,800.00	20.00	25.51	510.22	28		1,800.00
Material	500.00	3.30	1,650.00	400.00	3.56	1,425.55	86		1,650.00
Total	560.00		3,450.00	420.00		1,935.77	56	.00	3,450.00
154 Piping - Water									
Labor	40.00	30.00	1,200.00	45.00	27.29	1,228.00	100	28.00-	1,228.00
Material	400.00	3.88	1,550.00	425.00	3.87	1,645.22	100	95.22-	1,645.22
Total	440.00		2,750.00	470.00		2,873.22	100	123.22-	2,873.22
160 Set Equipment									
Labor	100.00	28.00	2,800.00	25.00	33.01	825.22	29		2,800.00
170 Check Test & Start									
Labor	40.00	26.25	1,050.00						1,050.00
175 Balancing									
Labor	40.00	30.00	1,200.00						1,200.00
200 General Conditions									
General			5,000.00			2,390.50	48		5,000.00
220 Travel & Subsistence									
General			2,500.00			1,875.23	75		2,500.00
230 Delivery									
General			1,000.00			325.00	33		1,000.00

Exhibit 37
Sample Sheet Metal Contractor
Committed Cost Variance Report

Phse	Cost Code	Cost Type	Cost Description	Estimated Cost	Costs Incurred	Committed Costs	Total Costs	Variance
100	101	Material	6x18 Metal Ducts	4,200.00	3,626.10	372.50	3,998.60	201.40
	102	Material	8x12 Metal Ducts	1,400.00	1,375.22		1,375.22	24.78
			Phase Total	5,600.00	5,001.32	372.50	5,373.82	226.18
104	101	Material	6x18 Duct Liner	1,000.00	1,000.00		1,000.00	0.00
	102	Material	8x12 Duct Liner	2,000.00	2,077.30	54.90	2,132.20	(132.20)
			Phase Total	3,000.00	3,077.30	54.90	3,132.20	(132.20)
130		Material	Wrapping for Ducts	1,500.00	1,374.83	372.00	1,746.83	(246.83)
		Material	Refrig. Pipe	1,650.00	1,425.55	410.00	1,835.55	(185.55)
			Phase Total	3,150.00	2,800.38	782.00	3,582.38	(432.38)
200		Admin	General Conditions	5,000.00	2,808.72	2,000.00	4,808.72	191.28
			Phase Total	5,000.00	2,808.72	2,000.00	4,808.72	191.28
			Job Total	16,750.00	13,687.72	3,209.40	16,897.12	(147.12)

Labor Reporting

Exhibit 38 presents a manual weekly labor report which can be produced for either the various activities or units of labor on the job. If phase costing is used, such a report is normally prepared for each phase within the job. The labor report in Exhibit 38 shows in alphabetic notation rather than in numeric notation. Many computerized job costing systems allow users to identify job cost codes alphabetically making it easier to identify the phase and/or activity.

Exhibit 39 provides a computerized example of a Labor Productivity Report comparing estimated to actual hours to units (quantity). By reviewing the Labor Productivity Report in Exhibit 39, Sample Contractor will note that his employees are less productive than estimated in lining the 6" x 18" ducts on this project. The contractor estimated that the employees would complete 50 feet per hour (estimated unit labor cost). To date, this work is being completed at the rate of 41.67 feet per hour (to date unit labor cost).

Exhibit 38

Labor Unit Cost Summary

Department ____________________

Job Name ____________________ Job No. ____________________ Week Ending ____________________

Code	Description	Unit Measure	This Week			Job to Date		
			Labor Hrs.	Units	Hrs./Unit	Labor Hrs.	Units	Hrs./Unit
FD	Fabricate Metal Duct	Pounds						
FFG	Fabricate Fiberglass Duct	Sq. Ft.						
FDWL	Fabricate Duct with Lining	Pounds						
ID	Install Duct	Lin. Ft.						
IR	Install Registers & Grilles	No. of						
LD	Loading and Delivery	No. of Hrs.						
AF	Assemble Furnace	No. of						
AAC	Assemble Air Conditioning	No. of						
PH	Piping Heating (Water & Steam)	Lin. Ft.						
PAC	Piping AC (refrigerant)	Lin. Ft.						
POT	Piping Oil Tanks	Lin. Ft.						
PG	Piping Gas	Lin. Ft.						
ST	Starting & Testing	No. of Hrs.						
B	Balancing	No. of Hrs.						
R	Rigging	No. of Hrs.						
WD	Wrapping Duct	Lin. Ft.						
T	Travel	Miles						
IT	Install Transite	Lin. Ft.						
TR	Trenching	Lin. Ft.						
MUA	Misc. & Unapplied	No. of Hrs.						
S	Supervision	No. of Hrs.						

Exhibit 39
Sample Contractor
Labor Productivity
Original Estimate

Job Number — Sheet
Executive Office Center

			Quantity		Hours		Unit Labor Cost		
Phase Cost Code	**Cost Description**	**Unit of Measure**	**Estimated**	**To Date**	**Estimated**	**To Date**	**Estimated**	**To Date**	**Variance**
100-101 -L	Fabricate 6x18 Ducts	Feet	500.00	394.00	100.00	74.00	5.00	5.32	0.32
100-102 -L	Fabricate 8x12 Ducts	Feet	1,000.00	563.00	150.00	87.00	6.67	6.47	0.20-
Phase Totals			1,500.00	957.00	250.00	161.00	6.00	5.94	0.06-
104-101 -L	Line 6x18 Ducts	Feet	500.00	500.00	10.00	12.00	50.00	41.67	8.33-
104-102 -L	Line 8x12 Ducts	Feet	1,000.00	650.00	17.50	12.00	57.14	54.17	2.98-
Phase Totals			1,500.00	1,150.00	27.50	24.00	54.55	47.92	6.63-
112- -L	Erect Duct-Surface	Feet	500.00		80.00		6.25		6.25-
Phase Totals			500.00		80.00		6.25		6.25-
114- -L	Erect Duct-Ladder	Feet	1,000.00		150.00		6.67		6.67-
Phase Totals			1,000.00		150.00		6.67		6.67-
130-101 -L	Wrap 6x18 Ducts	Feet	500.00		48.00		10.42		10.42-
130-102 -L	Wrap 8x12 Ducts	Feet	1,000.00		48.00		20.83		20.83-
Phase Totals			1,500.00		96.00		15.63		15.63-
150- -L	Install Refrig Pipe	Feet	500.00		60.00		8.33		8.33-
Phase Totals			500.00		60.00		8.33		8.33-
160- -L	Set Equipment				100.00				
Phase Totals					100.00				
170- -L	Check, Test & Start				40.00				
Phase Totals					40.00				
Job Totals			6,500.00	2,107.00	803.50	185.00	8.09	11.39	3.30

Completed Job Reporting

In addition to being an absolute necessity during the life of a job, job cost information can be of great value after the job is completed. Through analyzing the performance on individual jobs, the accuracy of future estimates can be improved. Increased estimating accuracy enables the company to get more profitable jobs. Furthermore, completed production cost information enables the company to decide the areas in which it needs production improvement. Companies usually find that such reporting also enables them to do a better job of evaluating individual employees and their performance on jobs.

The main point to remember in preparing completed job cost information is that it also should be done in the same manner as the estimate was prepared. The format of the report is usually the same as the in-process reports discussed throughout this manual.

One way of analyzing completed job information is by obtaining a report that provides a detailed listing of job cost transactions. By examining a report such as the Job Cost History Report in ***Exhibit 40***, a sheet metal contractor can identify all of the costs that have been incurred to date, for a specific period or for the life of the job. In a computerized environment, all of the descriptive information reflected on this report is a by-product of the processing of accounting transactions (invoices, payroll and inventory transfers).

Where unit and activity costing are consistent from job to job, estimating performance can best be improved by looking at the performance of those activities and units on many jobs. ***Exhibit 41*** presents an example Operation Unit Cost Report for four different jobs. The historical file of unit costs provides estimators with additional information on how costs are really running in the field and in the shop. Using this increased knowledge, estimators should be able to sharpen their accuracy in predicting what various units or activities will cost on future jobs.

Financial Reporting.

As discussed earlier in this manual, job costing provides the detail behind the "Earnings From Construction" section of the Income Statement (Exhibit 2). Because of the unique aspects of construction accounting, in which progress billings do not necessarily match the accumulation of the costs of construction in progress, it is often necessary to adjust Earnings from Construction to reflect revenue recognized under the Percentage of Completion method of accounting.

A report such as the Contracts in Progress Report shown in ***Exhibit 42*** can be used to identify the amount of over/under

Exhibit 40
Sample Contractor
Job Cost History

Job Number — Sheet
Name — Executive Office Center

Ven/Emp Number	Inv. No.	Chk No.	Phase	Cost Code	Description	Date	Qty./ Hours	Inc.	Admin.	Equip.	Labor	Mat'l	Sub Contr.	Other
Brown			100-101	-L	No Burden Calcu	15 Jan 1990	82.00				328.96			
							16.00							
Foley			100-101	-L	No Burden Calcu	15 Jan 1990	115.00				704.54			
							26.00							
Gibbs			100-101	-L	No Burden Calcu	15 Jan 1990	197.00				432.00			
							32.00							
Premier	123		100-101	-M	Duct Material	30 Dec 1989	300.00					1690.30		
Premier	187		100-101	-M	On Account	30 Dec 1989	325.00					1789.10		
Brown			100-102	-L	No Burden Calcu	15 Jan 1990	172.00				493.44			
							24.00							
Foley			100-102	-L	No Burden Calcu	15 Jan 1990	48.00				161.04			
							8.00							
Gibbs			100-102	-L	No Burden Calcu	15 Jan 1990	75.00				148.50			
							10.00							
James			100-102	-L	No Burden Calcu	15 Jan 1990	20.00				101.75			
							5.00							
Lopez			100-102	-L	No Burden Calcu	15 Jan 1990	248.00				853.60			
							40.00							
Premier 123			100-102	-M	Partial Shipment	30 Dec 1989	250.00					852.70		
Premier 187			100-102	-M	Partial Shipment	30 Dec 1989	500.00					1486.90		
	Phase 100 Totals						2332.00					5819.00		
							161.00				3223.83			
James			104-101	-L	No Burden Calcu	15 Jan 1990	500.00				222.00			
							12.00							
Lumber	89220		104-101	-M	Partial Shipment	30 Dec 1989	100.00					342.30		
James			104-102	-L	No Burden Calcu	15 Jan 1990	650.00				222.00			
							12.00							
	Phase 104 Totals						1250.00					342.30		
							24.00				444.00			
BW & Son	98772		200	-A	Delivery of Equip	30 Dec 1989			250.00					
Lion	1289		200	-A	Engineering Ser	30 Dec 1989			115.00					
	Phase 200 Totals													
									365.00					
	Job Sheet Totals						3582.00					6161.30		
							185.00		365.00		3667.83			

Exhibit 41

OPERATION UNIT COST REPORT
(SAMPLE)

(1) Code	(2) Description	(3) Job No.	(4) Total Direct Costs	(5) Labor Hours	(6) Labor Costs	(7) Units	(8) Total Cost Per Unit	(9) Hours Per Unit	(10) Labor Cost Per Unit
1704	(Unit Description)	Est. 182	91,376	11,600	91,376	161,376	.566	.072	.566
		Act.	81,034	10,376	79,257	123,850	.654	.084	.640
		Est. 183	40,177	6,200	40,177	79,116	.508	.078	.508
		Act.	46,352	7,668	45,379	75,535	.614	.102	.601
		Est. 184	56,664	8,100	56,664	113,328	.500	.071	.500
		Act.	15,634	2,502	14,355	19,414	.805	.129	.739
		Est. 185	48,572	6,900	48,572	83,494	.582	.083	.582
		Act.	53,260	7,744	50,966	85,342	.624	.091	.597
		Total Est.	236,789	22,800	236,789	437,314	.541	.075	.541
		Act.	196,281	28,291	189,956	304,141	.645	.093	.625

Exhibit 42
Sample Contractor
Contracts in Progress

Job #	Current Contract	Costs To Date	Est Costs To Complete	Total Est. Costs	Percent Complete	Revenue Earned	Billings To Date	Over Billings	Under Billings
90-10	52,250	36,681	10,919	47,600	77.06%	40,264	40,000		264
90-14	785,000	704,793	14,822	719,615	97.94%	768,831	750,000		18,831
90-15	55,000	9,219	30,200	39,760	23.19%	12,753	25,000	12,247	
90-19	197,107	26,761	100,308	127,069	21.06%	41,511	55,000	13,489	
90-20	212,847	91,824	79,006	170,830	53.75%	114,409	105,000		9,409
90-23	50,732	26,319	12,746	39,065	67.37%	34,178	30,000		4,178
90-24	597,791	268,375	295,374	563,749	47.61%	284,581	305,000	20,419	
90-25	19,014	5,111	10,100	15,211	33.60%	6,388	6,500	112	
	$1,969,741	$1,169,083	$553,475	$1,722,899	67.86%	$1,302,915	$1,316,500	$46,267	$32,682

billing on your jobs. The information from this report can be used to make the necessary journal entries to recognize revenue from jobs in progress under the percentage of completion method of accounting on your financial statements. In addition, a report such as the one presented in ***Exhibit 43*** will provide information needed by your bonding company.

The percent complete is calculated by dividing the costs to date by the total estimated costs (costs to date plus projected costs remaining). Percent complete is multiplied by the contract amount to determine the amount of revenue that should be recognized under the percentage completion method of accounting.

Over/under billing is determined by comparing the revenue recognized with the amounts billed (which can be automatically updated when billing is integrated with the computerized job cost accounting system).

Exhibit 43
Sample Sheet Metal Contractor
Cash Flow Report — By Job

Job No	Job Name	Total Contract	Billings To Date	Cash Received	Accounts Receivable	Total Est. Costs	Costs To Date	Payments To Date	Current Payables	Net Receivable (Payable)
2	Exec. Office	38,750.00	28,750.00	10,500.00	18,250.00	35,920.00	20,615.00	15,432.00	6,526.30	11,723.70
400	Farmingdale I	350,000.00	178,900.00	125,000.00	53,900.00	328,792.00	156,923.33	67,432.00	89,491.33	(35,591.33)
502	Building 36	35,000.00	25,000.00	15,000.00	10,000.00	31,250.00	18,795.00	13,267.50	5,527.50	4,472.50
500	Blue's Resturant	85,000.00	69,750.00	43,200.00	26,550.00	79,235.00	94,322.00	73,421.33	20,900.67	5,649.33
600	Building 25	10,000.00	10,000.00	0.00	10,000.00	9,250.00	13,927.44	10,114.20	3,813.24	6,186.76
	Company Total	518,750.00	312,400.00	193,700.00	118,700.00	484,447.00	304,582.77	179,667.03	126,259.04	(7,559.04)

Cash Flow Reporting

Cash flow reports, such as the one presented in Exhibit 43 can also become a by-product of your job costing system. By examining the Cash Flow Report—By Job the contractor will first see that there are not enough receivables to cover outstanding job related invoices for the company as a whole. Further analysis of this report identifies a potential cash flow problem on one particular job (Number 400—Farmingdale I). In order to meet the current cash requirements on this job, the contractor will need to further analyze the cash needs of this job by examining details behind the open payables and receivables for this job.

Conclusion

This manual has presented the various techniques that can be used for job costing and has mentioned many ways in which this information can be used to make a sheet metal company more successful in its operations. Remembering that no two companies are alike and not even two jobs are alike, you can decide upon some basic reporting criteria for your individual company. The overall company, the department, the kind of work, the phases of work, the activities, the units are all steps of detail which you should consider in establishing the kind of reporting system that you will have.

Obviously, accuracy will always be of high importance since inaccurate information may be more dangerous than no information at all. Remember to keep your own costing system as simple as possible, yet as meaningful as required.

This manual has also identified a variety of benefits that can be obtained by computerizing the job cost accounting and estimating operations of a sheet metal company. Since each sheet metal company is unique in its own way, management should identify the specific needs and wishes of their company in determining the computerized job cost accounting software that is right for them.

Company after company have found that job cost information, used correctly, enables them to become more successful than would have otherwise been possible. In the design and operation of your own system and in the selection and implementation of a computerized system, remember that the costing system should serve the needs of management.